

EPAct Program Update for Chet France

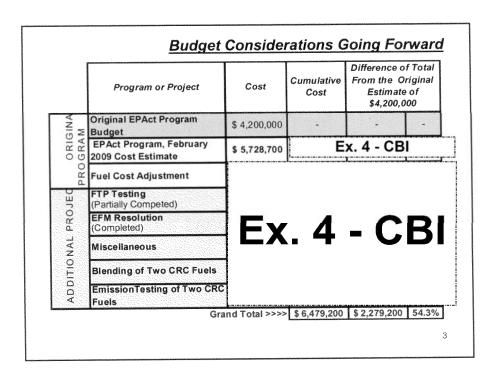
Status and Budget

March 2, 2009

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Status of Testing and Fuel Blending

- · Phase 1 testing complete
 - 75°F testing of 19 vehicles on 3 fuels (E0, E10, E15)
- Interim FTP-cycle testing complete
 - 75°F testing of 6 vehicles on 3 fuels (E0, E10, E15)
- · Phase 2 testing complete
 - 50°F testing of 19 vehicles on 3 fuels (E0, E10, E15)
- · Phase 3 testing expected to begin next week
 - 75°F testing of 10? (originally19) vehicles on 27 fuels (E0, E10, E15, E20)
- Test fuel development being done by Haltermann and ASD
 - EPA defines fuel recipes
 - Haltermann prepares hand blends, bulk blends and performs fuel analyses
- 22 of the 28 fuels needed in Phase 3 have been blended in bulk
 - 13 have been delivered to SWRI



Original program cost estimate: \$4,200,000
Cost overrun wrt the original scope of program: Ex. 4 - CBI
Cost overrun including additional projects: Ex. 4 - CBI
Funds spent or incurred as of Feb. 19, 2009 Ex. 4 - CBI
Funds "remaining" in LD EPAct budget as of Feb. 19, 2009 Ex. 4 - CBI
Estimated cost of Phase 3: Ex. 4 - CBI
Estimated cost of testing 2 CRC fuels in Phase 3: \$195,000
New funds needed to get us through the end of fiscal year: Ex. 4 - CBI
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Budget Considerations Going Forward (Cont'd)

Causes of Cost Overrun

- Unrealistically low original cost estimates by SWRI
 - Underestimation of base program cost: Ex. 4 CBI
 - On January 7, 2009, SWRI was estimating base program cost overrun by 10% vs. 36.4 % on Feb. 5, 2009
 - Unexpectedly high cost of "coming up to speed": Ex. 4 CBI
 - Additional checkout tests to resolve HC analyzer saturation and secondary dilution ratio issues in Phase 2 Ex. 4 - CBI
 - Higher than originally estimated test replication rate (+6%): Ex. 4 CBI
- Fuel cost increase (modified fuel development protocol):
 Ex. 4 CBI
- · Blending of two CRC fuels: \$55,000
- · Additional tasks:
 - EFM resolution: Ex. 4 CBI
 - Fuel matrix redesion Ex. 4 CBI Program execution problems:
 - FTP testing: Ex. 4 CBI
- Inadequate temperature control in Phase 2 of the program
- Fuels blended for Phases 1 and 2 contained undesireable components

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Options to Reduce Cost

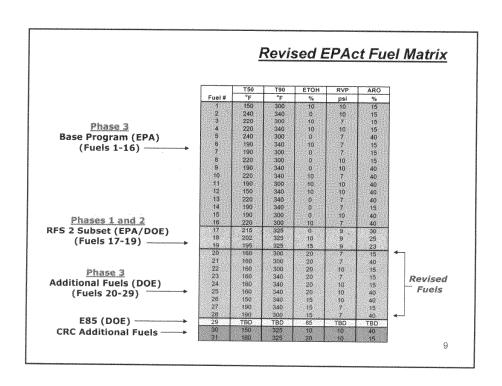
- Delay testing of CRC fuels: \$195,000
- · Reduce the number of test fuels
 - Reduction of the number of fuels by 1 would drop the G-efficiency of emission models below the minimum acceptable limit of 50%
 - · Coverage drops, fuel effects become confounded
 - The emphasis of this program is on fuels, not vehicles
- · Reduce the number test vehicles
 - Reduction of the number of vehicles from 19 to 15 doubles the probability of getting a non-significant result in emission models. The power of the statistical test of 0.80 is the lowest acceptable in std practice (0.95 was used in AutoOil)
 - We are working with DOE on vehicle selection
 - Reducing the number of test replicates from 2 to 1 has an even stronger impact
- Eliminate continuous THC, NOx.... measurements in raw exhaust
 - Would make critical types of information unavailable
 - Minimal savings
- · Reduce the scope of exhaust HC speciation
 - The cost of HC and alcohol/carbonyl speciation:
 Ex. 4 CBI
 - Data necessary for AQ modeling and toxic emission factors
 - · Phase I and II data not adequate due to fuel blending problems

Options to Reduce Cost (Cont'd)

- Work with SWRI to reduce program cost
- · Request additional DOE support

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Back-up Slides



Light Duty Exhaust Program Summary

- EPA/DOE collaboration
- Objective: Establish effects of RVP,T50,T90, aromatic content and EtOH on exhaust emissions from Tier 2 vehicles
- Fuel matrix includes 29 fuels + 2 added by CRC = total of 31
- Test Program Design
 - Phase 1: RFS 2 Pilot at 75°F
 - 3 fuels (E0, E10 and E15) tested in 19 vehicles
 - Test results to be available for RFS 2 NPRM
 - Phase 2: RFS 2 Pilot at 50°F
 - Same as Phase 1, except temperature
 - Phase 3: Main Program
 - 27 fuels tested in 19 Tier 2 vehicles, E85 tested in 4 FFVs
- LA92 test cycle used throughout the program
- Species measured: Regulated emissions, CO₂, NO₂, VOCs, ethanol, carbonyl compounds
 - N2O, NH3 and HCN by FTIR
 - Some PM and SVOC speciation

Measured Species

- Bag (phase) level and composite emissions of THC, NMHC, NMOG, CO, CO₂, NOx, NO₂, ethanol and PM
- Bag (phase) level speciated volatile organic compounds (VOCs)
 - · Over 200 compounds, incl. alcohols and carbonyls
- Continuous and integrated by bag (phase) emissions of the following species in raw exhaust:
 - THC, NMHC, CO, CO2, NOx
 - N₂O, NH₃ and HCN by FTIR for a subset of tests
- Semi-volatile and high molecular weight VOC and PM measured in Phases 1 and 2 only

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Projected Schedule Going Forward

- Launch of Phase 3 testing: Mid-February 2009
- Completion of Phase 3 testing: Early December 2009
- Reporting: December 2009 mid-March 2010

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Ex. 4 - CBI

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EPAct Cost Estimates (Assumes \$450,000 available from EPA), Feb 2 2009 Estimated cost of Phase 3 - UPPER LIMIT Estimated cost of Phase 3 - LOWER LIMIT Funds currently available from the EPA Additional funds from EPA Funds "released" by DOE due to reduced scope of Phase 3 (15 veh., -50% HC spec'n) Additional funds from DOE Scaling back of the number of vehicles to 15 Scaling back of exhaust HC speciation by 50% Elimination of continuous THC, NOx..... measurements in raw exhaust Total Additional funding needed to test 15 vehicles while scaling back HC speciation by 50% **Ex. 4 - CBI** EPAct Cost Estimates (Assumes \$950,000 available from EPA) Estimated cost of Phase 3 - UPPER LIMIT Estimated cost of Phase 3 - LOWER LIMIT Funds currently available from the EPA Additional funds from EPA Funds "released" by DOE due to reduced scope of Phase 3 (15 veh., -50% HC spec'n) Additional funds from DOE Scaling back of the number of vehicles to 15 Scaling back of exhaust HC speciation by 50% Elimination of continuous THC, NOx..... measurements in raw exhaust Total

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